June 27, 1961 C. R. HOAG 2,989,766

BRISTLE ANCHORING STRUCTURE AND ARTICLE

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Fig. 1

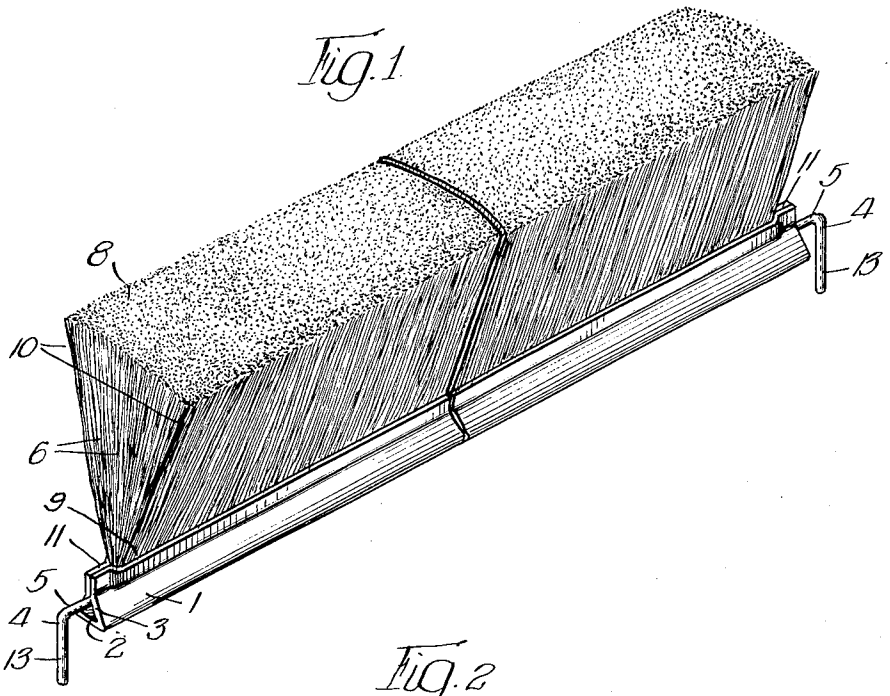


Fig. 2

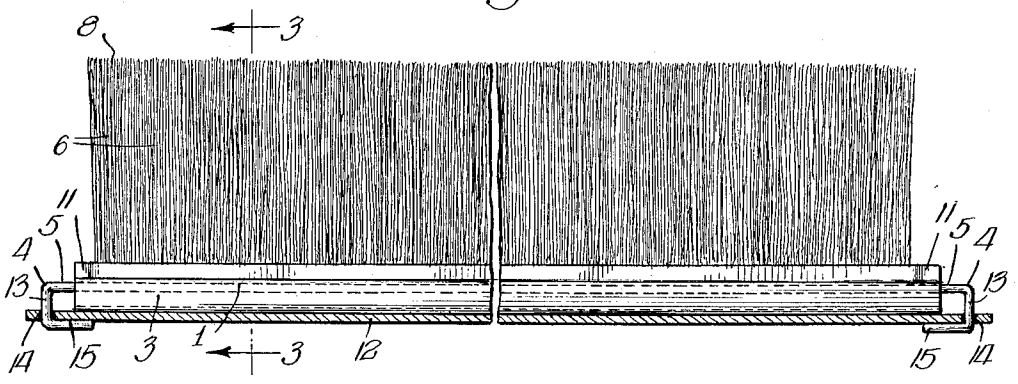
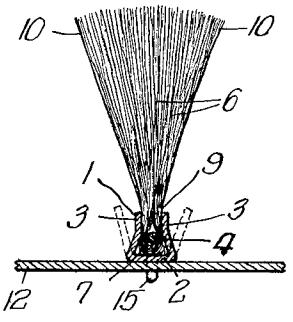


Fig. 3



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BRISTLE ANCHORING STRUCTURE AND ARTICLE

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Fig. 4

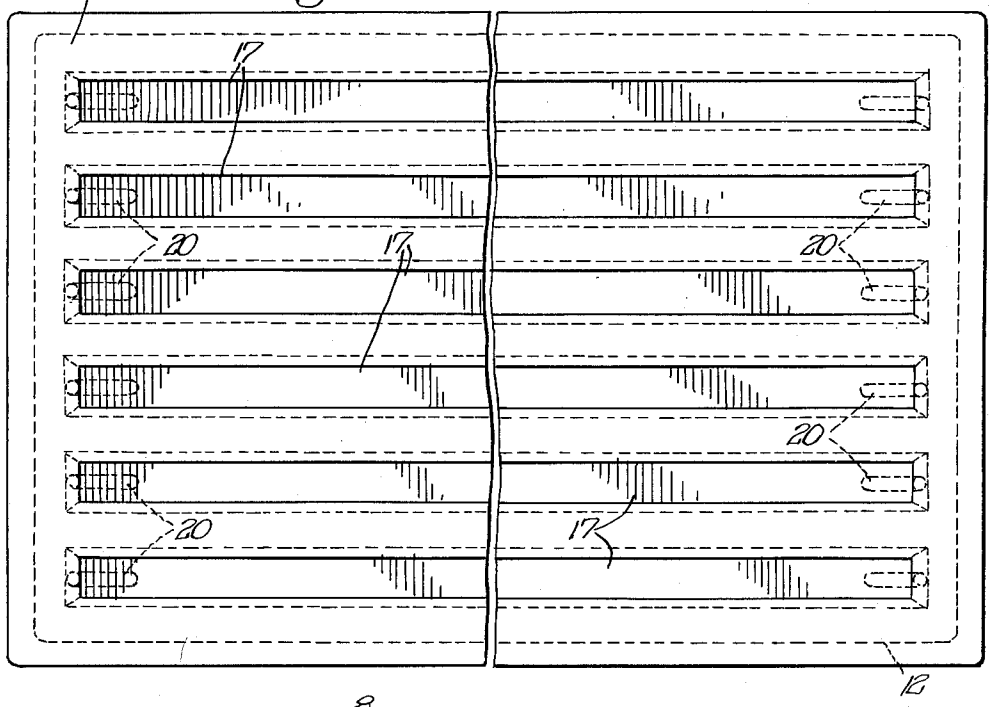


Fig. 5

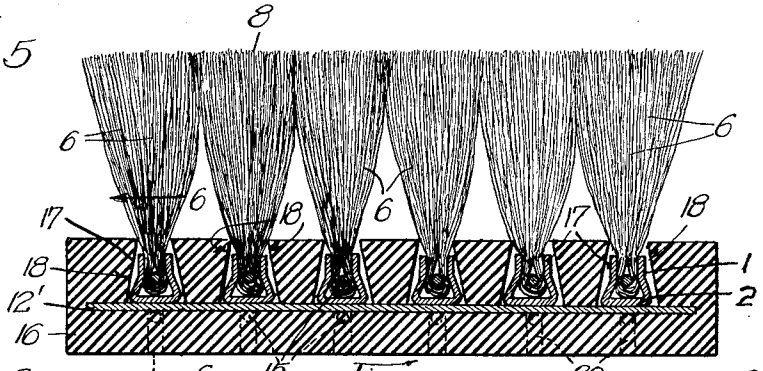
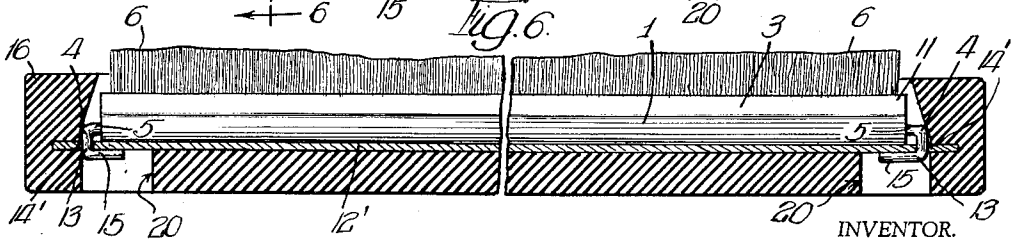


Fig. 6.



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BRISTLE ANCHORING STRUCTURE AND ARTICLE

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4 Claims. (Cl. 15—161)

This invention relates, in general, to a bristle and bristle channel anchoring structure, and has particular relation to an improved article embodying such structure.

While the particular article, which will be described hereinafter in connection with the drawings, is a mat for golf driving ranges and the like, or elsewhere as desired, it is to be understood that the bristle anchoring structure, in its broader aspects, is not limited to such use, but may be employed for anchoring channel strips with bristles, fibers or the like held therein and projecting therefrom, to a brush body or other support.

The bristle anchoring structure of the present invention is particularly adapted for use, for example, in connection with brushes employed in automatic vehicle or car washers, or elsewhere as desired.

Brush elements comprising elongated channel strips with the bristles, or fibers, arranged continuously along the strips and folded about core elements extending longitudinally within the channels of the strips and with the bristles clamped between the sides of the channels are known in the art.

Heretofore, the ends of the longitudinal element, usually in the form of a wire, rod or the like, have been terminated at or short of the ends of the channel strip. Attachment of the bristle carrying channel, or a group of such channels, to a plate, strip, brush body or other supporting member, has been accomplished by the employment of additional attachment means, or by welding or the like. Such additional attachment means and/or welding, present obstacles and problems which the present invention avoids, particularly with respect to the number of parts necessary and the number and types of operations required to manufacture the desired article.

According to the present invention, the bristles, fibers or the like, are folded about a wire, or rod, which is extended longitudinally between the sides of the channel member and the bristles are clamped between the sides of the channel with the ends of the bristles projecting from the channel. The ends of the longitudinal wire or rod, instead of being terminated at or short of the ends of the channel, are extended beyond the ends of the channel. The bristle carrying channel, or a group of such channels, are placed upon a plate, strip, or other supporting member, and the projecting ends of the bristle anchoring wire, or rod, are turned downwardly and passed through openings in the plate, strip, or other supporting member, and the downturned ends of the anchoring wire are crimped or clinched into engagement with the bottom of the plate, strip, or other support, not only more securely to hold the bristles in the channel, but to secure the bristle carrying channel to such plate, strip, or other supporting member without additional attachment means, and/or welding, or the like, and the additional operations thereby required.

The chief advantage of the invention is the ability to secure the bristle carrying channel to the plate, strip, or other supporting member by the same wire or rod which is used to secure the folds of the bristles within the channel of the channel strip.

Another advantage resides in the resulting ability to embed the plate, strip, or other supporting member, for example, by molding, in a rubber or rubber-like mat having undercut grooves or channels opening through the top or upper surface of the base of the mat and to

snap the bristle carrying channels into these grooves, pass the downturned ends of the wire, or rod, through openings in the plate, strip or other supporting member, and crimp them over and into engagement with the bottom of the plate to secure the bristle carrying channels in the base of the mat.

Numerous advantages and adaptations of the invention will be apparent from the following detailed description taken in connection with the accompanying drawings, it being understood that the invention is limited only within the scope of the appended claims and not to the particular embodiments selected for illustration.

In the drawings:

FIGURE 1 is a perspective view showing a bristle and bristle channel anchoring structure embodying the present invention;

FIGURE 2 is a side view of the elongated bristle carrying channel showing the same applied to a supporting member and the anchoring structure which secures the bristle carrying channel to the supporting member and more effectively anchors the bristles in the channel;

FIGURE 3 is a transverse sectional view taken along the line 3—3 of FIGURE 2;

FIGURE 4 is a top plan view of the base of a mat to which bristle carrying channels embodying the present invention are applied to form a mat for golf driving ranges and the like, or elsewhere as desired;

FIGURE 5 is a transverse sectional view through the mat along line 5—5 of FIGURE 4 and showing the bristle carrying channels applied thereto; and

FIGURE 6 is a longitudinal sectional view taken along the line 6—6 of FIGURE 5.

Referring now to the drawings, the bristle carrying and anchoring structure comprises an elongated channel member 1 of suitable material, preferably of thin walled metal. The channel member 1 has a bottom or base wall 2 and two oppositely disposed side walls 3. The channel member 1 is shown straight and elongated, but this may vary within the scope of the present invention.

A wire-like or rod-like element 4 of suitable material, preferably of metal, extends longitudinally through the channel member 1 between the side walls 3 thereof. The opposite ends of the wire, or longitudinally extending element 4 project beyond the opposite ends of the channel 1 at 5—5.

The fibers or bristles 6, which may, for example, be Tampico, or other suitable bristles, are folded between the side walls 3 of the channel 1, transversely about the longitudinal element 4, as indicated at 7 in FIGURE 3. The bristles 6 are arranged continuously from position near one end of the channel 1 to position near the opposite end of the channel.

The ends of the bristles 6 project outwardly from the channel to form at 8 the brush surface, or the bristle surface of the mat, or other article. The term "bristles" is herein used in a generic sense, and is intended to include vegetable fibers, such as hemp, or bristles of animal fibers, or synthetic fibers, or metallic fibers, or other suitable fibers or brush material or the like.

After the bristles 6 have been folded about the longitudinal element 4, and this element with the bristles folded about the same has been placed within the channel 1 and between the side walls 3 thereof, the channel 1 is bent to move the side walls 3 toward each other from the relative positions shown in dotted lines in FIGURE 3 to the positions shown in full lines in the same figure and in FIGURE 1.

The movement of the side walls 3 toward each other serves to complete the folding of the bristles 6. The bending or crimping of the side walls 3 into gripping engagement with the bristles outwardly of the portions

which are folded about the longitudinal element **4** may be effected in any suitable manner as, for example, by a pressing operation, or by passing the channel member longitudinally between two opposed forming rolls.

Upon crimping or bending the side walls **3** together, the outer longitudinal edges of the side walls **3** form a relatively narrow bite **9** through which the bristles extend. At the bite **9** the walls **3** grip the bristles **6** to hold the same approximately perpendicular to the base wall **2** and with their outer ends flaring apart as shown at **10** in FIGURES 1 and 3. With the longitudinally continuous bristles **6** terminating short of the opposite ends of the side walls **3** of the channel **1**, the side walls **3** in the aforementioned crimping or bending thereof are crimped or bent together, thus contacting and closing the bite **9** at the opposite ends of the bristles, as shown at **11**, **11** in FIGURE 1. This closing of the bite **9** at the opposite ends of the bristles prevents longitudinal movement or displacement of the bristles from the ends of the channel **1**.

The bristle carrying channel **1**, or a group of such channels, are placed upon a plate, strip or other supporting member **12** with the base wall **2** of the channel presented to the adjacent surface of such member **12**, as shown in FIGURE 2. The projecting ends **5** of the bristle anchoring element **4** are bent or turned downwardly at **13** and passed through openings **14** in the member **12**. The downturned ends of the longitudinal wire or element **4** are then bent, or crimped, or clinched at **15** beneath the member **12** and into engagement therewith. In this manner, not only is the bristle-carrying channel **1** firmly and securely attached to the member **12** by the longitudinally extending wire or element **4**, but crimping of the downturned ends of the element **4** into engagement with the bottom or under surface of the member **12** clamps the longitudinally extending portion of the element **4**, which is disposed within the channel **1**, against the folded bases of the bristles **6**, more securely to hold the bristles in the channel. The supporting member **12** may be of metal, plastic material, or any other suitable material.

In the mat for golf driving ranges, or elsewhere as desired, as shown in FIGURES 4, 5 and 6, the supporting member is in the form of a plate **12'** embedded, by molding, in a rubber, or rubber-like base **16**. The base **16** has a plurality of parallel grooves or channels **17** opening from the plate **12'** through the top or upper surface of the base **16**. The sides of the grooves **17** are preferably undercut, as shown at **18** in FIGURE 5, so that the groves **17** will be wider at their lower ends and narrower at their upper ends. The ends of the grooves **17** may be similarly undercut, as shown at **19** in FIGURE 6.

After the base **16** of the mat is prepared, the bristle carrying channels **1**, as shown in FIGURE 1, are snapped into the grooves **17** to position with their base walls **2** seating upon the plate **12'**. In inserting the bristle carrying channels **1** into the grooves **17**, the downturned ends of the anchoring wire or element **4** are passed through openings **14'** in the plate **12'**; also through registering openings **20** in the portion of the base **16** which is disposed beneath the plate **12'**. The openings **20** are elongated longitudinally, as shown in FIGURE 6, to permit the lower ends of the downturned ends **13** of the anchoring wire or element **4** to be bent, crimped or clinched up beneath the bottom of the plate **12'** and into engagement therewith.

The bristle carrying channels **1** are thus securely attached to the plate **12'** by the longitudinal wires or rods **4** about which the bristles are folded, and are thus secured in the base **16** of the mat. The channels **1** and bristles **6** are disposed in longitudinally parallel rows, and with the bristle carrying channels in transversely spaced relation, as shown in FIGURE 5. The bristles **6** flare outwardly and upwardly from the narrow bites **9** extending longitudinally along the upper ends of the channels **1** and the upper flaring ends of the bristles **6** meet to form a bristle surface **8** which is substantially continuous, not only longitudinally of the mat as shown in FIGURE 6, but also substantially continuous transversely of the mat as shown in FIGURE 5.

The undercut ends **19** of the grooves **17** provide undercut spaces for receiving the closed ends **11** of the channel flanges **3** at opposite ends of the bites **9** in which the bristles are gripped. With the bristle carrying channels **1** attached to the plate **12'** and the plate **12'** molded or otherwise embedded and thus secured in the base **16** of the mat, the bristles are thus secured to the base **16** and their upper ends present a bristle surface from which, for example, a golf ball may be driven where the mat is for use at golf driving ranges and the like. The term "mat," however, is used herein in a generic sense and is intended to include mats for other purposes.

The embodiment of the invention shown in the drawings is for illustrative purposes only, and it is to be expressly understood that said drawings and the accompanying specification are not to be construed as a definition of the limits or scope of the invention, reference being had to the appended claim for that purpose.

I claim:

1. A mat, comprising, in combination, a base composed of resilient material, a plate member embedded in said base, said base having a plurality of parallel grooves opening from said plate member through the upper surface of said base, said grooves having undercut sides so that the grooves will be wider at their lower ends and narrower at their upper ends, channel strips snapped into said grooves, said channel strips having bottom walls presented to said plate member and oppositely disposed side walls, anchoring elements extending longitudinally through said channels, and bristles folded within said channels about said elements and gripped between the side walls of said channels, the ends of said anchoring elements projecting beyond the ends of said channels and turned downwardly through openings in said plate member, the downturned ends of said elements being clinched against the bottom of said plate member to secure said bristle carrying channels in the grooves in the base of the mat.

2. A mat, according to claim 1, wherein the bristles are arranged in longitudinally continuous rows and terminate short of the opposite ends of the side walls of the channels to provide extensions of the channels beyond opposite ends of the rows of bristles, the side walls of said channels along the extents of the rows of bristles being crimped together to form relatively narrow bites along which said side walls grip the bristles to hold the same in place, the side walls of said channels beyond the ends of the rows of bristles being crimped together to close the ends of said bites.

3. A mat, according to claim 1, wherein there are openings which open downwardly from said plate member through the bottom surface of said base to permit the lower ends of the downturned ends of said anchoring elements to be clinched against the bottom of said plate member.

4. A mat, according to claim 1, wherein the base of the mat is composed of rubber material and the bristles are composed of fiber.

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